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Morphological, Karyological and Taxonomic Studies of
Freshwater Planarians from South Brazil

IV. *Dugesia anderlani* sp. nov. (Turbellaria, Tricladida, Paludicola), a New
Species from São Leopoldo in Estado de Rio Grande do Sul¹⁾

With 7 Text-figures

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ABSTRACT A new species of the genus *Dugesia* (Turbellaria, Tricladida, Paludicola) from the vicinities of São Leopoldo, Estado de Rio Grande do Sul, Brazil, is described: *Dugesia anderlani* KAWAKATSU et HAUSER, sp. nov. The present new species has dorsal testes and an asymmetrical penis papilla. It differs from *D. paramensis* from Colombia and *D. andina* from Argentina in the details of the genital anatomy. The karyotype of *D. anderlani* sp. nov. consists of 9 pairs of meta- or submetacentric chromosomes ($2x=18$ & $3x=27$).

INTRODUCTION

The purpose of this paper is to present a proper description of a new Brazilian freshwater planarian species referred to in the authors' previous papers as *Dugesia* (?) sp. (cf. KAWAKATSU, HAUSER and FRIEDRICH, 1980; KAWAKATSU, OKI, TAMURA, YAMAYOSHI, HAUSER and FRIEDRICH, 1980; OKI, TAMURA, YAMAYOSHI, KAWAKATSU, HAUSER and FRIEDRICH, 1980).

1) Part of this study was presented at the 51st Annual Meeting of the Zoological Society of Japan held at Shizuoka, on October 2–4, 1980 (cf. KAWAKATSU, OKI, TAMURA, YAMAYOSHI, HAUSER and FRIEDRICH, 1980; OKI, TAMURA, YAMAYOSHI, KAWAKATSU, HAUSER and FRIEDRICH, 1980).

For several years, animals of this species were collected from the vicinities of São Leopoldo, Rio Grande do Sul, and cultured in the laboratory of HAUSER and FRIEDRICH in the UNISINOS (they called the animal "white-ear"). Externally, this species can easily be separated from *Dugesia schubarti* (MARCUS, 1946), a common species distributed in the northeastern area of Estado de Rio Grande do Sul located in the southernmost part of Brazil. Its habitats are much limited. Moreover, collection of the fully sexually mature specimens is very difficult because they show low population density in the field.

At the time KAWAKATSU visited the UNISINOS in the winter of 1979, three of the authors (HAUSER, FRIEDRICH and KAWAKATSU) succeeded in collecting the "white-ear" planarians from the two localities they studied: a narrow mountain stream at Linha Julio de Castilho, the upper stream of the Rio Caí, near Harmonia, approximately 12 km SE of São Salvador do Sul (Lat. 29°30'S and Long. 51°27'W; alt. 200 m; coll. July 5, 1979; w. t. 13°C) and the lower part of the Arroio Paixão, the upper stream of the Rio Caí, near Nova Petrópolis, approximately 21 km S of Caxias do Sul (Lat. 29°22'S and Long. 51°11'W; alt. 300 m; coll. July 20, 1979; w. t. 12°C) (see KAWAKATSU, HAUSER and FRIEDRICH, 1980, p. 137, St. 8, p. 138, St. 10 and fig. 6).

One sexually mature specimen was found in the animals collected from the latter locality (it was fixed with Bouin's fluid: KAWAKATSU's Specimen Lot No. 1592-a; the holotype specimen which will be destinated in the present paper). KAWAKATSU, HAUSER and FRIEDRICH prepared the slides for chromosomal analysis of this species based upon the remaining non-sexual specimens. OKI, TAMURA and YAMAYOSHI, who studied the slides prepared in the laboratory of the UNISINOS and brought by KAWAKATSU to their laboratory in Osaka, succeeded in observing and determining the chromosome numbers of this species.

Only one sexually mature specimen mentioned above was prepared for taxonomic study in KAWAKATSU's laboratory (cut in serial sagittal sections at 8 micrometers and then stained with Delafield's hematoxylin and erythrosin). The animal proved to be in a fully sexually mature condition.

SPECIES DESCRIPTION

Order TRICLADIDA

Suborder PALUDICOLA or PROBURSALIA

Family Dugesiidae BALL, 1974

Genus *Dugesia* GIRARD, 1850

Dugesia anderlani KAWAKATSU et HAUSER, sp. nov.

The specific name of this new species is dedicated to the late Dr. Hanns ANDERLAN, Professor Emeritus of the Universität Innsbruck and a well-known turbellariologist, who was HAUSER's best friend as well as the teacher of FRIEDRICH in her doctoral course at Innsbruck. He was also a respectful friend by correspondence

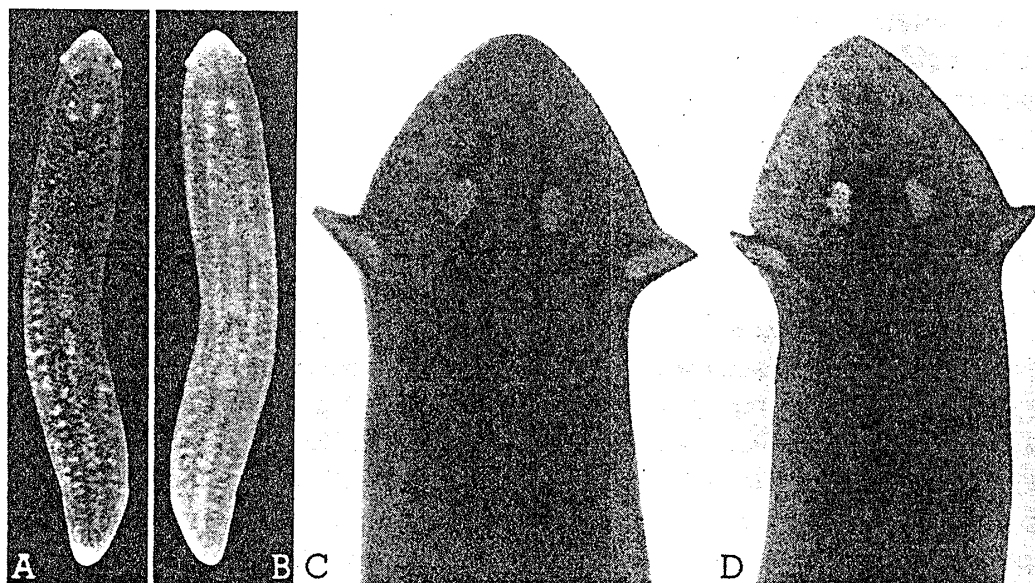


Fig. 1. *Dugesia anderlani* sp. nov. (Specimen Lot No. 1592), photographs of live and preserved specimens from the Arroio Paixão, Rio Grande do Sul, Brazil. A, Dorsal view of preserved specimen (No. 1592-a); B, ventral view of the same specimen. C and D, Dorsal views of the head in life (another specimen).

of KAWAKATSU in his studies on turbellarians.

External features. The living sexually mature specimen from the Arroio Paixão locality measured 12 mm in length and 1.5 mm in width. Smaller, non-sexual specimens measured approximately 8 to 10 mm and 1 mm in width. The external appearance of the preserved specimen (Lot No. 1592-a; holotype) is shown in Fig. 1 (A and B). Enlarged photographs of the head of another non-sexual specimen in life are also shown in Fig. 1 (C and D).

In life the head has a regular triangular form with moderate-sized, pointed and prominent auricles. The non-pigmented auricular sense organ, which has a lanceolate form, is conspicuous on each side of the head (Fig. 1 C and D). Behind the auricles, the body first narrows slightly, then gradually widens, reaching its greatest width at the level of the pharynx and the copulatory apparatus. The posterior end of the body is bluntly pointed (Fig. 1 A and B).

Coloration of the dorsal surface is a uniform blackish brown with numerous blackish spots. The body margin and the areas above the pharynx and the copulatory apparatus are of a lighter hue. The ventral side is dark grayish-brown with numerous dark pigments (Fig. 1 A and B). In the preserved specimen, ovaries, testes and spermiducal vesicles can be seen from the surface of the body as white spots (Fig. 1 A and B).

The two rather small eyes are situated on the dorsal side of the head; the distance between them is about one-fourth the width of the head at the level of eyes. Each eye has a reniform, pigment-free ocular area (Fig. 1 A, C and D). The pharynx is



Fig. 2. Sagittal pharyngeal section of *Dugesia anderlani* sp. nov. (No. 1592-a). 1, Longitudinal fibers of outer muscle zone; 2, circular fibers of outer muscle zone; 4, longitudinal fibers of inner muscle zone; 5, circular fibers of inner muscle zone. phl, pharynx lumen.

inserted at about midbody and is about one-sixth as long as the body.²⁾ The genital pore opens somewhat anterior to the middle of the postpharyngeal region (Fig. 1 B).

Internal features. The inner pharyngeal musculature is typical of the family Dugesiidae; it consists of two distinct layers, a thick circular layer adjacent to the epithelium of the pharynx lumen and a thinner layer of longitudinal fibers. The outer pharyngeal musculature consists of two layers, a thin outer layer of longitudinal fibers and a thin inner layer of circular ones (Fig. 2). The anterior trunk of the intestine bears about 15 lateral branches; each posterior trunk, 10 to 15 lateral branches

The general position of the genital organs can be seen in the photomicrographs of Figs. 3 and 5 (A and B). The dorsal testes are rather large in size (especially in the posterior part of the body), numerous, and arranged on either side of the midline in two or three longitudinal rows extending from the posterior level of ovaries almost to the posterior end of the body. Behind the level of the copulatory apparatus, they occupy almost all the dorso-ventral space (Figs. 3, 5 B). The total number of testes in the holotype specimen is estimated to be 60 or more. Spermiducal vesicles are well developed in the present new species (Fig. 3).

The hyperplastic ovaries are found at the posterior level of the head (see Fig. 1 A and B). They are separated into 10 or more fragments of various sizes and large ones occupy the dorso-ventral space (Fig. 5 A). Numerous yolk glands are distributed throughout the body in the surrounding mesenchyme (Fig. 3).

A sagittal view of the copulatory apparatus of the holotype specimen is shown in Fig. 4, and pertinent photomicrographs of the apparatus are shown in Fig. 5 (C-E). The penis has a very large, hemispherically shaped (or shaped as the umbrella of a

2) Due to the limited number of animals examined, the pigmentation of the surface of the pharynx in this new species was not examined yet.

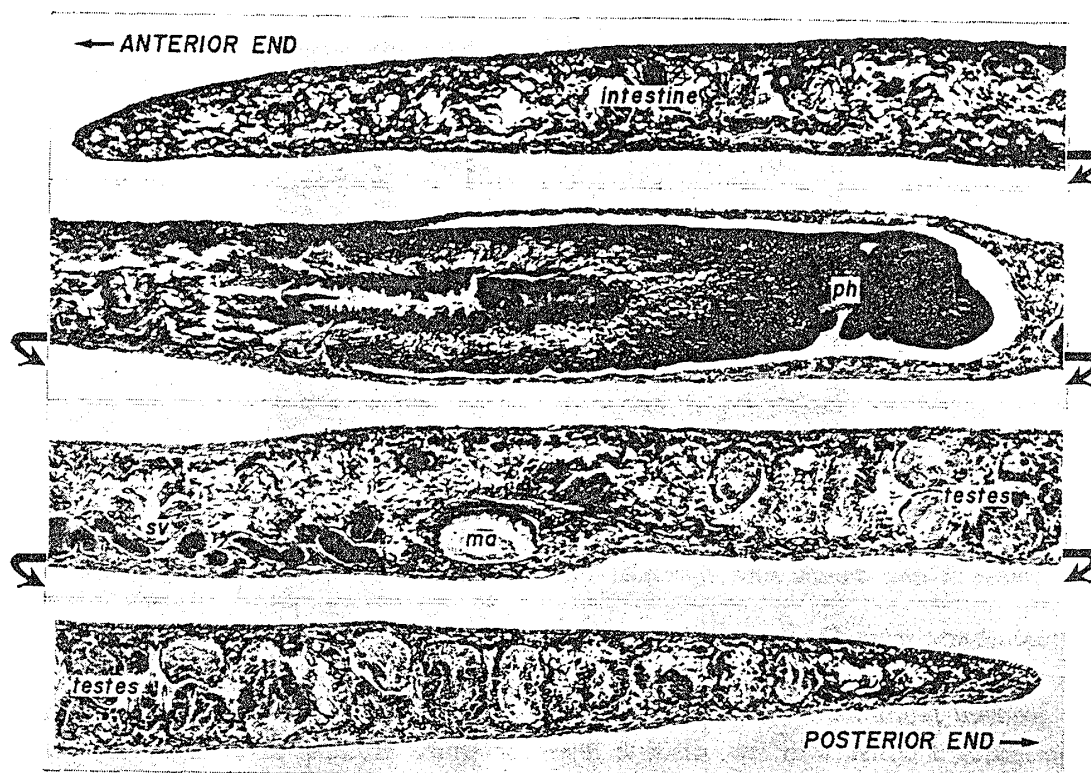


Fig. 3. Sagittal section of *Dugesia anderlani* sp. nov. (No. 1592-a). ma, male genital antrum; ph, pharynx.

mushroom) bulb embedded in the parenchyma and a large, bluntly pointed papilla of a conical shape projecting into the male genital antrum (Figs. 4, 5 C-E). The bulb is moderately muscular in nature and contains a wide, gourd-shaped bulbar cavity (Figs. 4, 5 C-E). As shown in Fig. 4, the antero-ventral chamber of the bulbar cavity is a true seminal vesicle and receives a pair of separated sperm ducts at its roof. The seminal vesicle connects with the postero-dorsal chamber of the bulbar cavity by a short, rather wide canal, and then continues to a narrow ejaculatory duct. The ejaculatory duct is located at the ventral side in the papilla of a highly asymmetrical shape and opens at its ventral side near the tip (Figs. 4, 5 D-E). The postero-dorsal chamber of the bulbar cavity and the ejaculatory duct are lined with the glandular epithelium of a nucleate type. Below this epithelium there is a single layer of circular muscle fibers. The epithelial cells of the seminal vesicle are less developed than those of the other parts of the penis lumen (Figs. 4, 5 C). The penis bulb is pierced by numerous ducts of the penis glands.

The dorsal lip of the penis papilla is much larger than the ventral one. Both of these lips are covered with a glandular, nucleate epithelium. Below this epithelium there are two layers of muscle fibers, one circular and the other longitudinal. The covering epithelium and the epithelial musculature of the papilla are more developed at the dorsal lip than at the ventral lip.

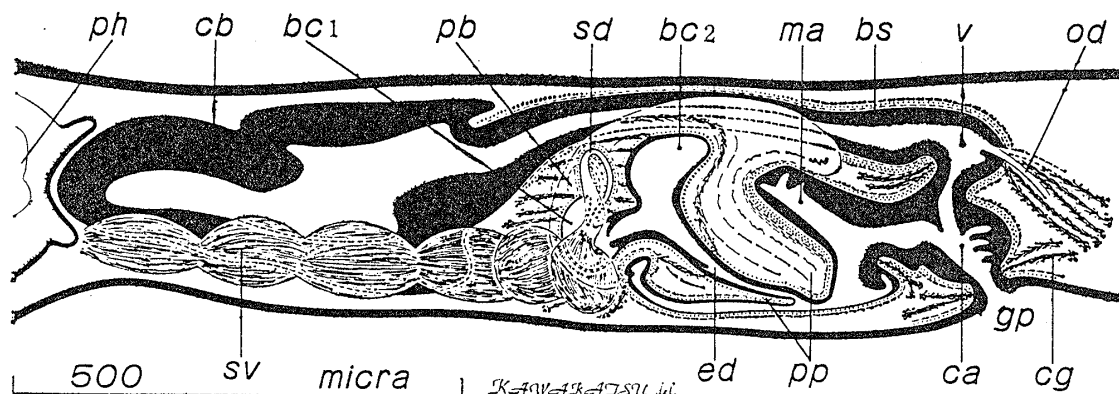


Fig. 4. Semidiagrammatic sagittal view of the copulatory apparatus of *Dugesia anderlani* sp. nov. (No. 1592-a, holotype). bc1, antero-ventral chamber of the bulbar cavity (seminal vesicle); bc2, postero-dorsal chamber of the bulbar cavity; bs, bursa stalk; ca, common genital antrum; cb, copulatory bursa; cg, cement gland; ed, ejaculatory duct; gp, genital pore; ma, male genital antrum; od, ovovitelline duct; pb, penis bulb; ph, pharynx; pp, penis papilla; sd, sperm duct; sv, spermiducal vesicle; v, vagina.

The male genital antrum is a wide, drinking horn-shaped cavity which widens anteriorly and narrows posteriorly. It opens to the common genital antrum posteriorly. The roof and the posterior part of the floor of the male antrum and the common antrum are lined with a tall, glandular, nucleate epithelium. The subepithelial musculature of both the male and common antra consists of inner circular and outer longitudinal muscle fibers (Fig. 4).

The copulatory bursa of the present new species is an extraordinary large organ and is irregularly lobed. The bursa stalk, a long duct almost uniform in diameter, runs posteriorly close to the midline, and then widens at its posterior terminal portion as a less-developed vagina, and opens into the common genital antrum (Figs. 4, 5 C). It is lined with a tall, glandular, nucleate epithelium. The anterior two-thirds of the bursa stalk has a muscle coat consisting of an inner thin layer of longitudinal fibers and an outer thin layer of circular ones. The posterior one-third of the stalk, including the less-developed vagina, has also the third, thin, outer layer of longitudinal muscle fibers. Two ovovitelline ducts which open separately into the posterior part of the vagina are accompanied by many erythrophilic glands.

The cocoon of the present new species is not known.

Holotype. One set of sagittal serial sections (Specimen No. 1592-a; 6 slides) is now retained in KAWAKATSU's laboratory, Fuji Women's College, Sapporo. After the serial studies on the freshwater planarians from Central and South Americas are completed by the senior author, the holotype of the present new species will be deposited in the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Locality. The lower part of the Arroio Paixão, the upper stream of the Rio Caí, near Nova Petrópolis, approximately 21 km S of Caxias do Sul, Rio Grande do

Sul, Brazil. Collected by KAWAKATSU, HAUSER, S. J., FRIEDRICH, and some other members of their laboratory of the UNISINOS, on July 20, 1979 (see "Introduction").

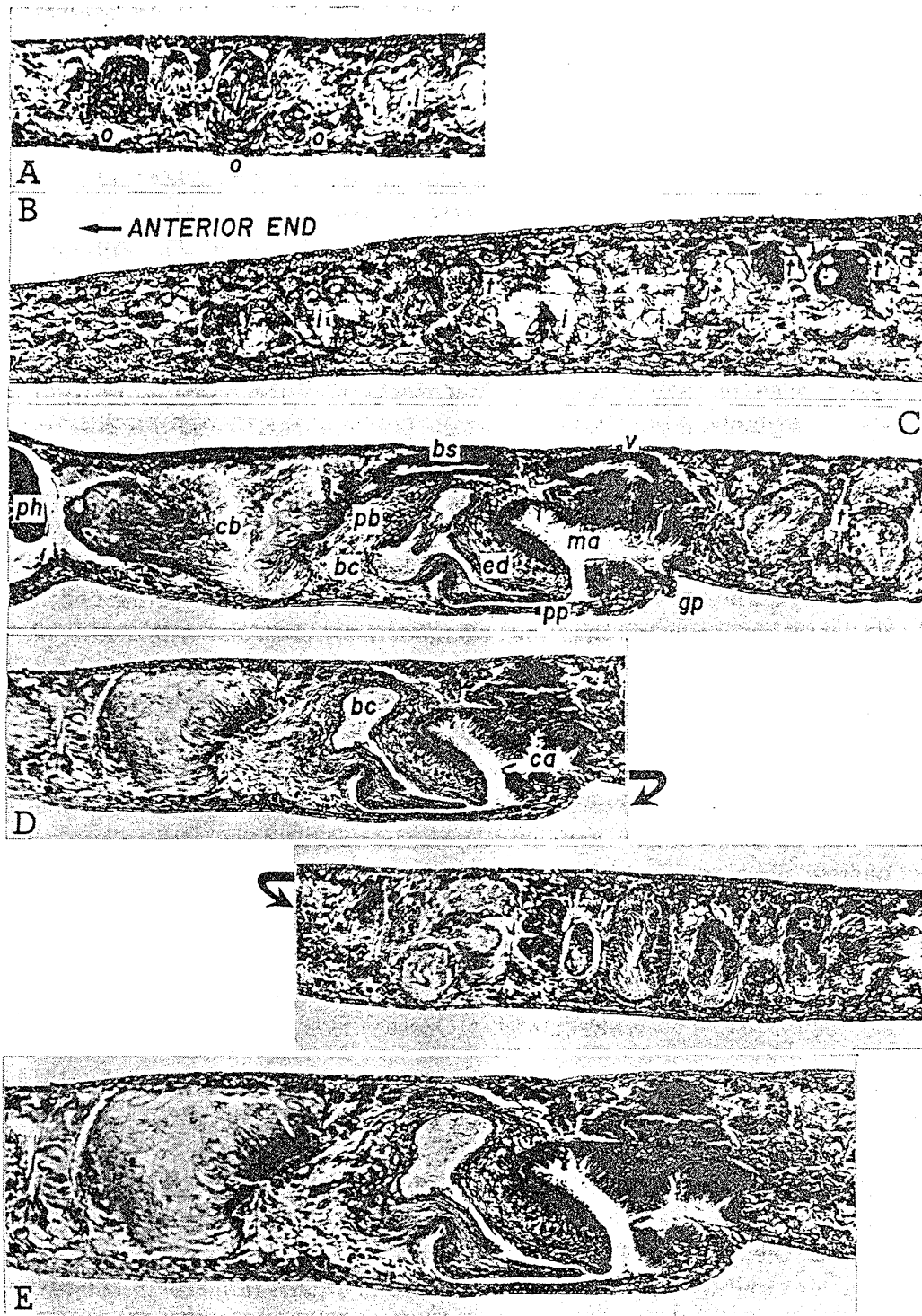
Taxonomic remarks and differential diagnosis. The known species of the genus *Dugesia* (s. l.) GIRARD, 1850 from North, Central and South Americas are listed in the following papers: BALL (1969, 1971, 1974); KENK (1972 — the U. S. only, 1974); KAWAKATSU, HAUSER and FRIEDRICH (1976, 1980 — Brazil only); MITCHELL and KAWAKATSU (1973 a, b). In addition to those about 30 species, *Dugesia miltgeni* GOURBAULT, 1980, is recently described from Guadeloupe, the West Indies.

During the past several years, some of the *Dugesia* species from these geographical areas have been restudied by several authors. The taxonomic positions and/or the distribution ranges of the following species are now clear. These species are as follows:

Dugesia tigrina (GIRARD, 1850) from the United States (KAWAKATSU and MITCHELL, 1981 a) and Brazil (KAWAKATSU, HAUSER, FRIEDRICH and SOUZA LIMA, 1982; KAWAKATSU, OKI, TAMURA, YAMAYOSHI, HAUSER and FRIEDRICH, 1981); *Dugesia dorotocephala* (WOODWORTH, 1897) from the Southern United States and México (KAWAKATSU and MITCHELL, 1981 c); *Dugesia guatemalensis* MITCHELL et KAWAKATSU, 1973, from México (KAWAKATSU and MITCHELL, 1981 b); *Dugesia cubana* CODREANU et BALCESCO, 1973, from Cuba (GOURBAULT, 1979); *Dugesia longistriata* (FUHRMANN, 1914), *Dugesia paramensis* (FUHRMANN, 1914) and *Dugesia cameliae* (FUHRMANN, 1914) from Colombia (BALL, 1980); *Dugesia schubarti* (MARCUS, 1946) from Brazil (KAWAKATSU, HAUSER, FRIEDRICH and SOUZA LIMA, 1982). *Dugesia jimi* MARTINS, 1970, from Brazil is a synonym of *D. tigrina* (cf. KAWAKATSU, OKI, TAMURA, YAMAYOSHI, HAUSER and FRIEDRICH, 1981). *Dugesia polyorchis* (FUHRMANN, 1914) from Colombia seems to be a synonym of *Dugesia festai* (BORELLI, 1898) (cf. BALL, 1980). *Cura azteca* BENAZZI et GIANNINI, 1971, from México should be corrected as *Dugesia azteca* (BENAZZI et GIANNINI, 1971) (cf. KAWAKATSU and MITCHELL, 1982, MS.). *Dugesia rincona* MARCUS, 1954, a species reported only from Chile, is found in the northwestern part of Cordillera de los Andes, approximately 200 km NE of Lima, Peru (cf. KAWAKATSU and MITCHELL, MS.).

Externally, *Dugesia anderlani*, the present new species, may be very similar to the following species: *Dugesia festai* (BORELLI, 1898) from Bolivia, Peru, Ecuador, Colombia (cf. BALL, 1980), Panama, Venezuela, and Curaçao (including unpublished data by KAWAKATSU and MITCHELL); *Dugesia rincona* MARCUS, 1954, from Chile and Peru (cf. KAWAKATSU and MITCHELL, MS.); *Dugesia anceps* (KENK, 1930) (olim *Planaria dubia* BORELLI, 1895) from Argentina and Paraguay; *Dugesia dimorpha*

Fig. 5. Sagittal sections of the holotype specimen of *Dugesia anderlani* sp. nov. (No. 1592-a). A and B, Parts of the prepharyngeal region; C, D and E, copulatory apparatus. E, Enlarged photomicrograph. bc, bulbar cavity; bs, bursa stalk; ca, common genital antrum; cb, copulatory bursa; ed, ejaculatory duct; gp, genital pore; i, intestine; ma, male genital antrum; o, ovary; pb, penis bulb; ph, pharynx; pp, penis papilla; t, testis; v, vagina.



(BOHMIG, 1902) from Chile; *Dugesia paramensis* (FUHRMANN, 1914) from Colombia. Among these 5 species, *D. anceps*, *D. dimorpha* and *D. paramensis* have an asymmetrical penis papilla. The dorsal testes are, however, only found in *D. paramensis*. Judging from the well-defined redescription of *D. paramensis* by BALL (1980, pp. 236–237, figs. 3 and 4), *D. anderlani* can easily be distinguished from *D. paramensis* by the details of the genital anatomy. *Dugesia andina* (BORELLI, 1995) from Argentina has a *D. anceps*-like head, the dorsal testes, a divided genital antrum, and a rather short penis papilla (cf. BALL, 1971, p. 18, 1980, p. 241, table 1). Although the schematic figure of the copulatory apparatus of this species given in the original description is a horizontal view (cf. BORELLI, 1995, p. 6, fig. 3), the anatomy of the penis lumen of *D. anderlani* is different from that of *D. andina*.

Dugesia anderlani differs from the other members of the genus in the following characters: living animal moderate-sized (ca. 12 mm in length) and blackish brown-colored with numerous blackish spots on the dorsal surface; head regular triangular with middle-sized auricles, and non-pigmented auricular sense organ is conspicuous; two eyes (the distance between them is rather narrow); external musculature of the pharynx consisting of outer longitudinal and inner circular layers; dorsal testes in two to three longitudinal rows on either side extending to the posterior end; penis bulb very large, hemispherical in shape and moderately muscular with a wide bulbar cavity of a gourd-form which is separated into two chambers, the anterior seminal vesicle into which sperm ducts enter separately from its roof and the postero-dorsal one connects with an ejaculatory duct; highly asymmetrical penis papilla large, blunt and conical (dorsal lip of the papilla is extraordinarily large) and external opening of the ejaculatory duct on the under side of the penis; genital antrum separated into the male and common antra; copulatory bursa extraordinarily large in size, with a rather narrow bursal canal which opens to the common genital antrum; the posterior one-third of the bursa stalk forms a less-developed vagina into which ovovitelline ducts enter separately at its posterior part.

KARYOLOGICAL OBSERVATION

Chromosomes of regenerating somatic cells were observed according to the technique described in the previous papers (cf. OKI, TAMURA and KAWAKATSU, 1976; OKI, TAMURA, YAMAYOSHI and KAWAKATSU, 1980, p. 4, fig. 4).

From the study of a single non-sexual specimen from the type-locality of *Dugesia anderlani*,³⁾ the occurrence of two different types of cells intermingled in one animal was observed: the diploid cells ($2x=18$) and the triploid cells ($3x=27$) (see Table 1 and Figs. 6, 7 A and B). The karyotype consists of 9 pairs of meta- or submetacentric chromosomes in a descending order of size (see idiograms in Fig. 6).

3) Samples for the chromosomal examination were prepared by KAWAKATSU and FRIEDRICH in cooperation with HAUSER in their laboratory, on August 22–23, 1979. These slides were given to OKI and his team members on August 29.

1	2	3	4	5	6	7	8	9
52	7C	62	50	15	11	1C	12	5C
57	5(5)	5(1)	11	52	11	51	11	52

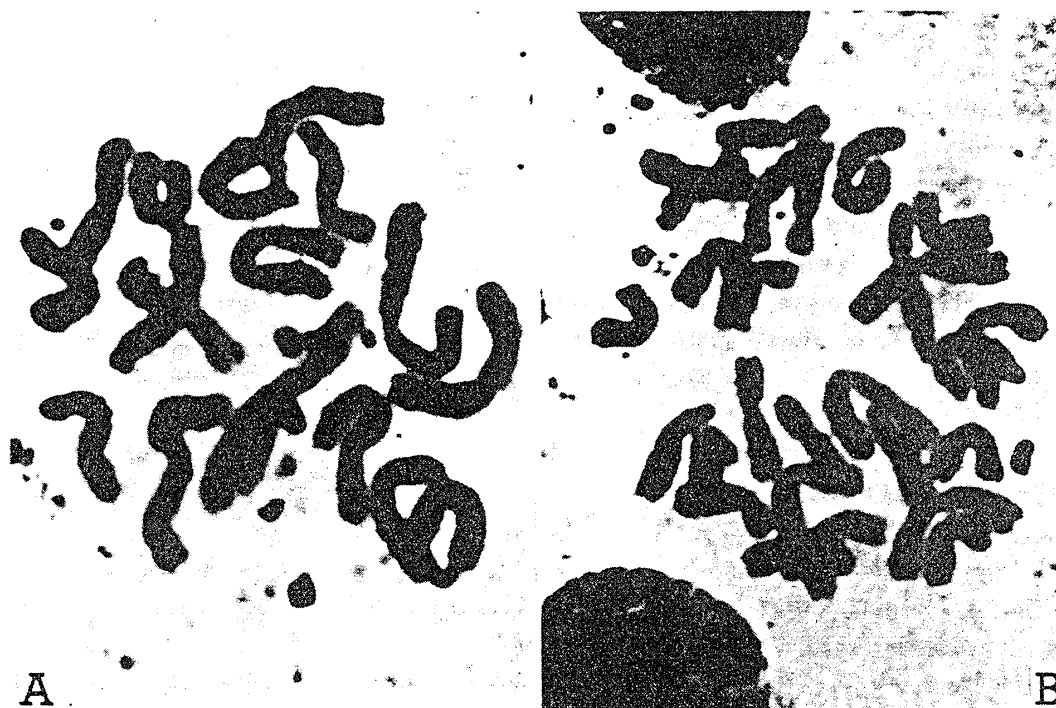
Fig. 6. Idiogram of *Dugesia anderlani* sp. nov. ($2x=18$ & $3x=27$).Fig. 7. Photomicrographs of the chromosomes of *Dugesia anderlani* sp. nov. A, $2x=18$; B, $3x=27$.

Table 1
Karyotype of *Dugesia anderlani* sp. nov. from the Arroio Paixão,
Rio Grande do Sul, Brazil.

No. of specimens examined cytologically	Chromosome nos. & the no. of cells studied in parentheses
1 (No. 1592 group)	$2x=18$ (6) & $3x=27$ (7)

Remarks on the karyotypes of the Dugesia species from North, Central and South Americas:— Up to the present, the karyotypes of the 9 *Dugesia* species from these geographical areas are reported. The summarized data are as follows:

Dugesia tigrina (GIRARD, 1850). $2x=16$ (loc. Base Line Lake in Michigan, U. S. A.: DAHM, 1958, p. 28, table 2, p. 188, appendix 2). $2x=16$, $n=8$ (loc. the St. Lawrence River, Canada: BENAZZI, GIANNINI-FORLI and PUCCINELLI, 1971, 1 page; cf. BENAZZI and BENAZZI-LENTATI, 1976, p. 20, table 2a; BENAZZI, 1982, p. 309, table 1). $2x=16$, $n=8$ (loc. São Leopoldo, Rio Grande do Sul, Brazil: OKI, TAMURA, YAMAYOSHI, KAWAKATSU, HAUSER and FRIEDRICH, 1980, p. 628; KAWAKATSU, OKI, TAMURA, YAMAYOSHI, HAUSER and FRIEDRICH, 1981, pp. 125–128, table 1, fig. 11 A–D).

Dugesia dorotocephala (WOODWORTH, 1897). $2x=16$, $n=8$ (loc. Pennsylvania, Massanetta Spring in Virginia, South Virginia and Buckhorn Spring in Oklahoma, U. S. A.: BENAZZI, 1966, pp. 999–1005, figs. 1–4; cf. BENAZZI, GIANNINI and PUCCINELLI, 1970, pp. 81–82, figs. 2 and 3; cf. BENAZZI and BENAZZI-LENTATI, 1976, p. 20, table 2a; BENAZZI, 1982, p. 309, table 1). $2x=16$ & $3x=24$ (loc. Blacksburg in Virginia and Brandywine in West Virginia, U.S.A.: BENAZZI and PUCCINELLI, 1982, pp. 205–208, figs. 1 and 2).

Dugesia jenkinsae BENAZZI et GOURBAULT, 1977. $2x=8$, $n=4$ (loc. Sabino in Arizona and San Felipe in Texas, U. S. A.: BENAZZI, 1975, pp. 490–492, table 1, fig. 1). The karyotype of this species was at first reported as *D. dorotocephala* (BENAZZI, 1975; cf. BENAZZI and BENAZZI-LENTATI, 1976, p. 20, table 2a; BENAZZI, 1982, p. 309, table 1). See also BENAZZI and GOURBAULT (1977) and GOURBAULT (1977).

Dugesia arizonensis KENK, 1975. $2x=8$, $n=4$ (loc. Madera Canyon and the Chivichua Mountains in Arizona, U. S. A.: GOURBAULT, 1977, pp. 63–68, table 1, figs. 1–3; cf. BENAZZI, 1982, p. 309, table 1).

Dugesia cubana CODREANU et BALCESCO, 1973. $2x=18$, $n=9$ (loc. La Cueva de Santo Thomas, Pinar der Rio, Cuba: GOURBAULT, 1979, pp. 134–139, table 1, figs. 2–5; cf. BENAZZI, 1982, p. 309, table 1).

Dugesia miltgeni GOURBAULT, 1980. $2x=8$, $n=4$ (loc. Guadeloupe, West Indies: GOURBAULT, 1980, pp. 753–756, table 1, figs. 2 and 3).

Dugesia schubarti (MARCUS, 1946). $2x=8$, $n=4$ (loc. Estação Biológica de Boracéia, Mun. Salesópolis, Estado de São Paulo, Brazil: PEREIRA, 1970, pp. 211–212, fig. 1; cf. BENAZZI and BENAZZI-LENTATI, 1976, p. 21, table 2a; KAWAKATSU, HAUSER and FRIEDRICH, 1980, p. 136, fig. 5). $2x=8$, $n=4$, $2x=8$ & $3x=12$, $2x=8$ & $3x=12$ & $4x=16$ (loc. São Leopoldo, Rio Grande do Sul, Brazil: OKI, TAMURA, YAMAYOSHI and KAWAKATSU, 1980, p. 17, fig. 15 C, 1981, p. 65; OKI, TAMURA, YAMAYOSHI, KAWAKATSU, HAUSER and FRIEDRICH, 1980, p. 628).

Dugesia anceps (KENK, 1930). $2x=16$, $n=8$ (loc. Museo di Istoria Naturale in Buenos Aires, Argentina: DURÁN-TROISE and DE LUSTIG, 1970, pp. 455–459, figs. 1–6; cf. BENAZZI and BENAZZI-LENTATI, 1976, p. 20, table 2a; BENAZZI, 1982, p. 309, table 1).

Dugesia sanchezi HYMAN, 1959. $2x=16$, $n=8$ (loc. Santiago, Chile: BENAZZI, 1978, pp. 299–301, fig. 1; cf. BENAZZI, 1982, p. 309, table 1).

Among these American species of *Dugesia*, only *D. cubana* has the chromosome numbers of $2x=18$ and $n=9$. Its karyotype consists of 5 pairs of metacentric chromosomes, 3 pairs of submetacentric ones and 1 pair of subtelocentric one (cf. GOURBAULT, 1979, p. 139, fig. 3). The karyotype of *Dugesia anderlani* is very different from that of the former. No subtelocentric chromosomes are observed in the present new species.

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